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(71) Applicant(s)

BSH Bosch und Siemens Hausgeräte GmbH
(Incorporated in the Federal Republic of Germany)
Hochstrasse 17, 81669 München,
Federal Republic of Germany

(72) Inventor(s)

Gerd Wilsdorf

(74) Agent and/or Address for Service

Dr Walther Wolff & Co
6 Buckingham Gate, LONDON, SW1E 6JP,
United Kingdom

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(54) Abstract Title

Program setting in a program-controlled domestic appliance

(57) A program-controlled domestic appliance includes operating control means to control the appliance to operate in accordance with an operating program composed by the user from a plurality of program parameters (4, 5, 6, 7). Each parameter has a plurality of setting possibilities. Associated with each parameter is a respective one of a plurality of setting elements (8, 9, 10, 11), for example rotary switches, which are each operable to select a setting for the associated parameter. The appliance also includes a display (3), by which the selected parameter settings are displayed not only at the conclusion of the selection process, but also in the course of the process itself. The user is thus provided with a clear presentation of setting data without recourse to scales arranged around individual setting elements or to positional states of the elements themselves.

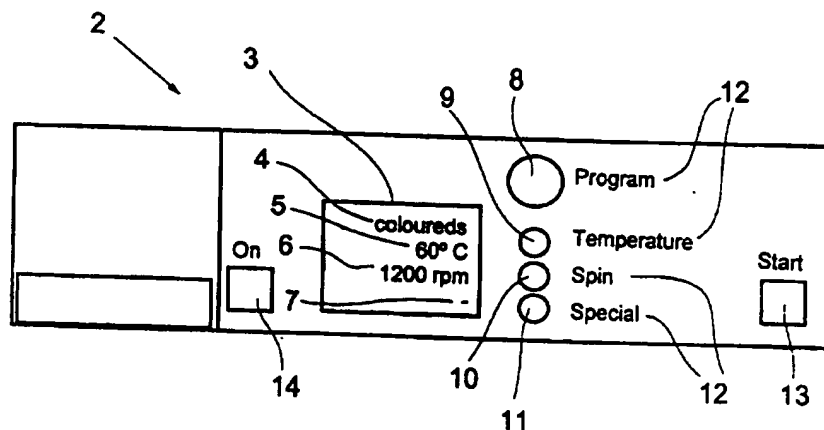
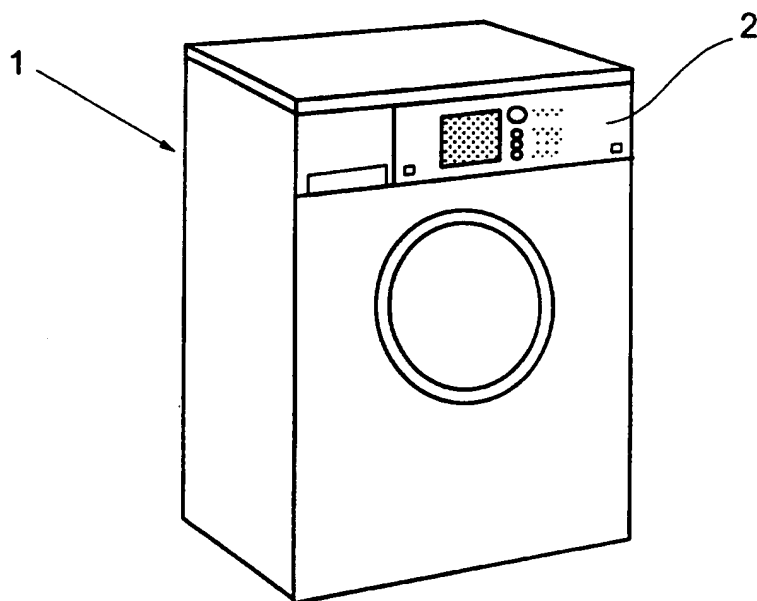
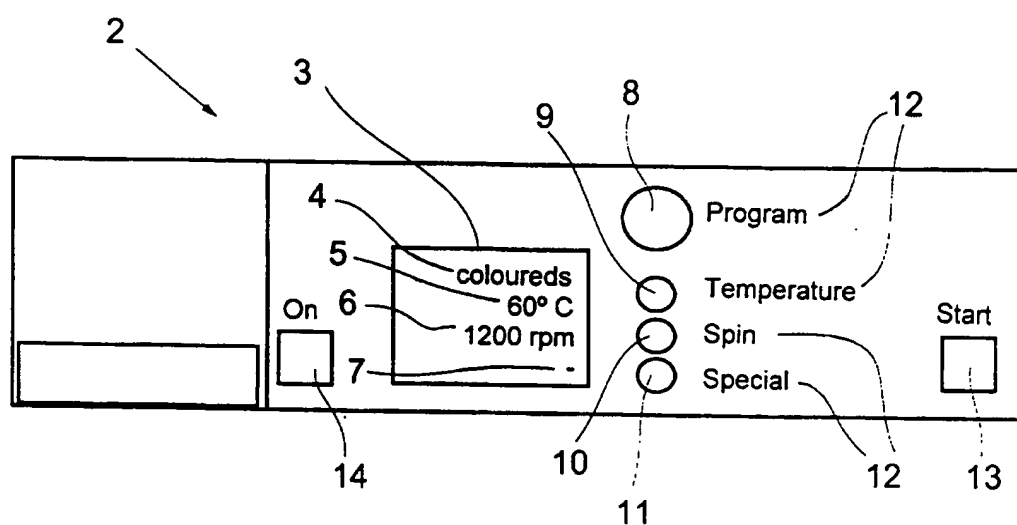


Fig. 2

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**Fig. 1****Fig. 2**

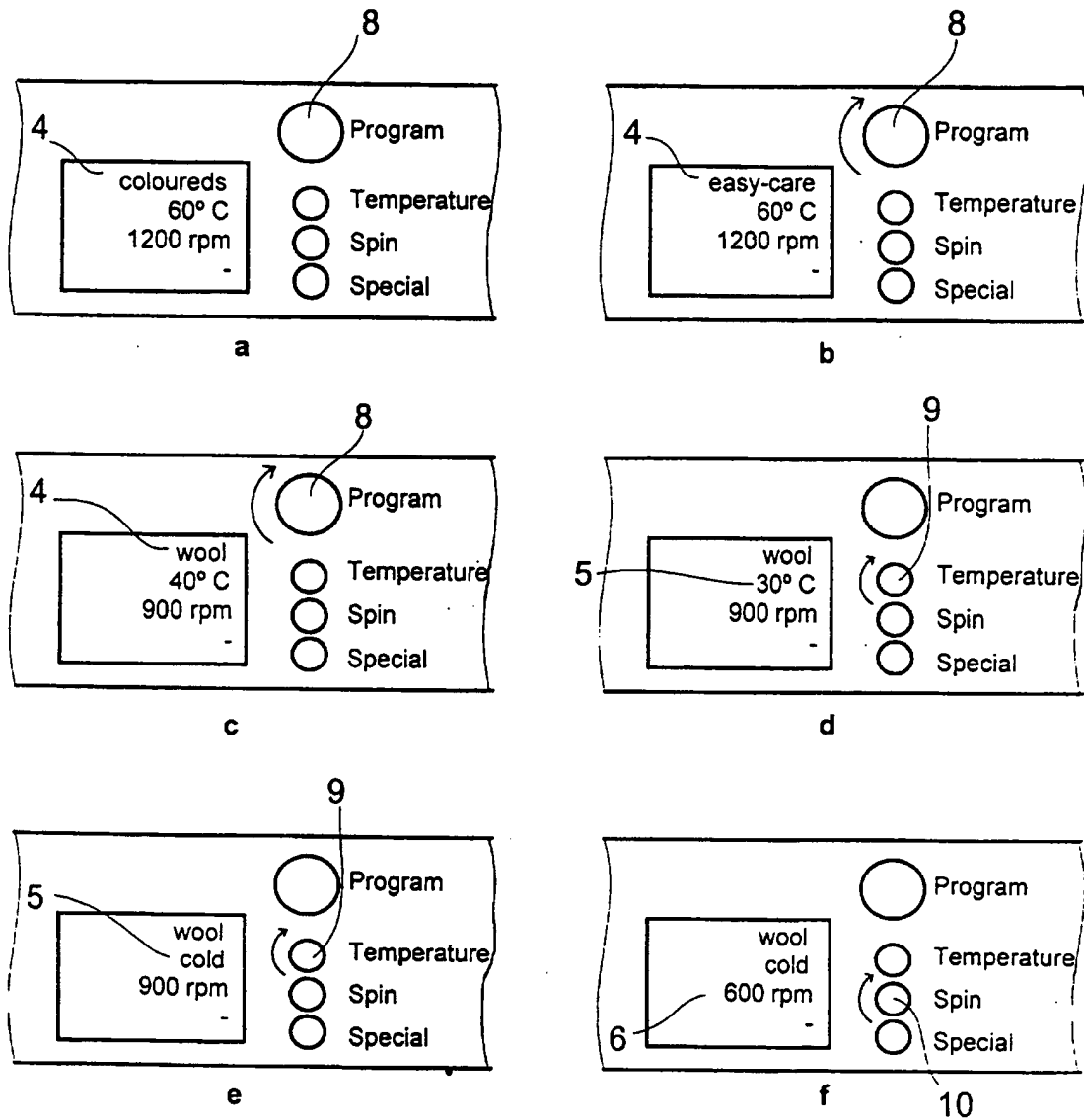
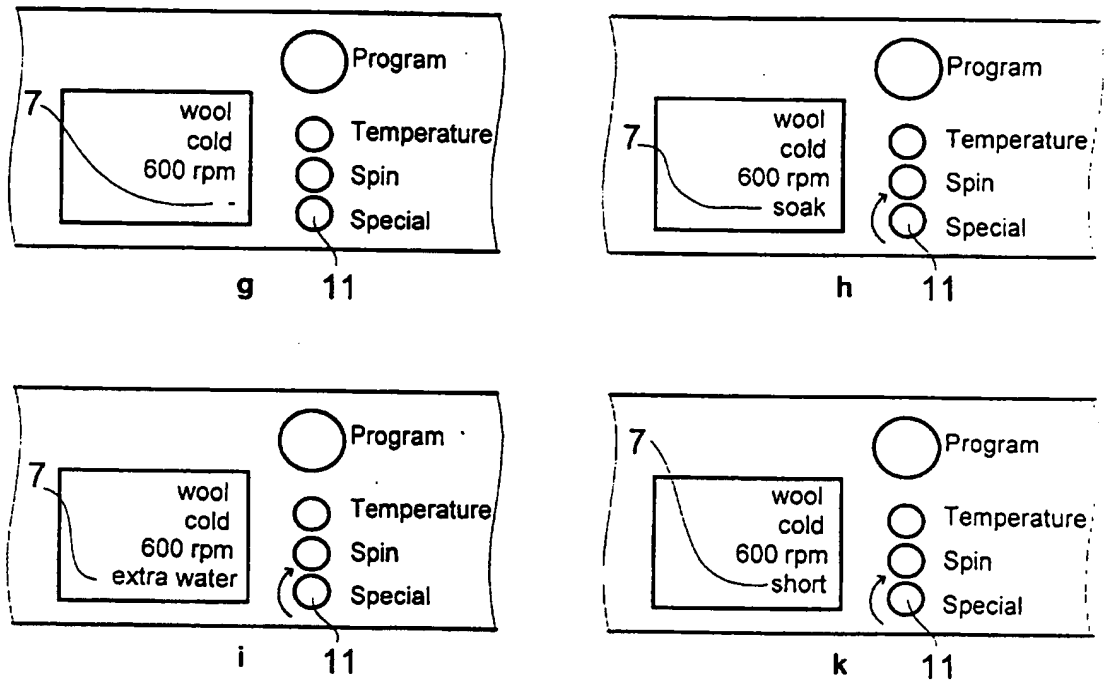


Fig. 3

**Fig. 4**

PROGRAM SETTING IN A PROGRAM-CONTROLLED DOMESTIC APPLIANCE

The present invention relates to a method of setting an operating program of a program-controlled domestic appliance and to a program-controlled domestic appliance in which the program can be set.

In a program-controlled domestic appliance, several settings usually have to be undertaken in dependence on the desired operating program. In case of a washing machine, these settings can be, for example, the kind of program, such as coloured laundry, delicate laundry or laundry able to be boiled, the washing temperature, the spinning speed and additional settings. Such additional settings, in the case of a washing machine are, for example, a prewashing phase or a preliminary soaking of the laundry, washing with increased quantity of water and a washing program shortened in time.

Program-controlled domestic appliances are known (DE 35 42 503 A1) in which the operating program settings are changed each time by a setting element and thus set in accordance with the wishes of the user. For this purpose, rotary or pushbutton switches are provided. As a rule, pushbutton switches are used for settings which have only two possibilities of setting, such as "with prewashing" or "without prewashing", and rotary switches are used for multiple setting possibilities greater than two. The display of the actual setting in the case of a rotary switch is usually by a scale which shows the different setting possibilities on the control panel surface of the appliance and which extends around the rotary switch, and a marking on the rotary switch to indicate the selected setting. In the case of pushbutton switches, the actual setting usually has to be deduced from the state of the switch, which in a depressed position is normally an on-setting and which projects further out in an off-setting. The actual setting in some circumstances is thus not indicated very clearly.

The operating control systems in such domestic appliances have, in particular, the following disadvantages. The display of the actual setting in the case of both rotary switches and pushbutton switches is provided by the switch itself and/or by a scale or marking disposed in its immediate proximity. Since the different switches are, because of their space requirement, distributed on the control panel of the appliance, this leads to a large area of the panel having to be surveyed for determining all the operating program settings by reading off the settings from the different switches. This is awkward and leads

to an increased risk of erroneous settings, since distribution of the setting displays is such that one of them can easily be out of view and thus overlooked. In addition, the space around the switches is very small and leaves little room for detailed or even sufficiently explicit references to the actual setting, so that the risk of misunderstandable or at least poorly readable statements exists. This risk is present particularly in the case of pushbutton switches, in which the difference between the switch position is usually inconspicuous. However, rotary switches with many switch settings also permit errors in reading-off, because of the small angular differences between adjacent rotary settings and because of possible parallax errors.

There is therefore a need for a method of setting an operating program of a program-controlled domestic appliance in which the operating program settings are clearly surveyable and capable of being read off, can be indicated without risk of misunderstanding and are settable in a secure manner.

According to a first aspect of the present invention there is provided a method of setting an operating program from several operating program parameters of a program-controlled domestic appliance with several setting elements which serve for the setting of operating programs, in which the individual operating program parameters are set by associated setting elements, characterised in that several operating program parameters are displayed together by means of a display equipment of the appliance during the input of operating programs.

According to a second aspect of the invention there is provided operating control means for a program-controlled domestic appliance for performance of the method according to the first aspect of the invention, comprising several operating program parameters and several setting elements which are associated with the operating program parameters and by which the associated operating program parameters are settable, characterised in that several operating program parameters can be displayed together by means of a display equipment of the appliance during the input of operating programs.

In the case of an example of the first aspect and embodiment of the second aspect of the invention, the settings can be read off together at one glance and are not distributed over a control panel surface. The settings can thus be surveyed in a much simpler manner. It can also be recognised more reliably whether the actually set program corresponds with

the wishes of the user and there is less risk of overlooking a false setting, which results, for example, from forgetting to enter a change after a preceding operating cycle of the appliance. In addition, due to the use of display means which can be separated from the setting elements, the operating program settings can be indicated in more detail and more clearly than would be the case in the vicinity of and/or directly at the setting elements, where the restricted possibilities of display and space conditions prevail.

Advantageously, one of a preset selection of operating program-setting possibilities is selectable by at least one of the setting elements. Thus, for each operating program setting, a selection of different possibilities can be put together, which can be run through by the user. In the case of a continuously settable parameter, such as, for example, washing temperature or spinning speed, the selectable possibilities can be restricted to values which are the most practicable, so that the selecting process is simple and rapid.

For preference, the setting possibilities of a preset selection can be switched through in steps in both possible sequences, in order to facilitate orientation of the user with respect to the setting possibilities and the selected setting itself.

If the kind of program is one of the parameters, it is of advantage if the selected program kind is displayed by the display means and only those settings of the other parameters which are permissible for the particular program kind are offered as setting possibilities. Thus, for example in the case of a washing machine, high temperature values are not needed for washing coloureds, so that in the case of setting the program kind "coloureds" high temperature values are excluded from the selection of the setting possibilities. This prevents the selection of settings which contradict one the other and the operation is made more simple and surveyable, since only the setting possibilities actually appropriate are offered.

When program kind is a parameter, it can be possible to store the program kind together with the further parameter settings. For this purpose, the setting element associated with the program kind can be a rotary switch with a integrated pushbutton switch, on the actuation of which the set program kind together with the further parameter settings is stored. If, for example, the different program kinds are frequently used with the same settings of the other parameters, such as temperature or spinning speed, these parameter settings can be stored for the respective program kind and thus be preset for future

appliance operations during the selection process. The possibility of changing these settings can, however, continue to be available.

For adaptation to the personal demands of a user, at least one storage space can be provided for a program specific to the user with respect to program kind possibilities, the further parameter settings associated with which can be set and stored for this user-specific program. Thus, the user can compose his or her own program without having to change the remaining presettings. In such a case, it can be arranged that only the settings of the user's personal program can be changed, whilst the settings for the remaining program kinds are secured against storage with changed settings departing from those preset by the manufacturer.

The different operating program settings are, with particular advantage, indicated line-by-line one below the other. This makes possible, inter alia, a particularly easily surveyable display of the different settings.

The display equipment, advantageously for example in the form of a dot matrix display, indicates alpha-numerically, so that the operating program settings can, for easier understanding, be read in uncoded text.

Advantageously, the settings elements comprise rotary switches. These are familiar to the user from known operating control devices and enable a reliable change in settings by virtue of the fact that the user can normally grip rotary switches firmly between two fingers. Moreover, the setting possibilities can be switched rapidly on in steps, which is important in the case of numerous setting possibilities, and can also be progressed through in both possible sequences through change in the direction of rotation.

The setting elements can also comprise pushbutton switches by which the setting possibilities are switched on in steps. In that case, the pushbutton switches can be detenting or non-detenting. The latter are then expediently associated with an electronic actuating storage device. An advantage of pushbutton switches is the smaller space requirement. In addition, pushbutton switches can be accommodated aesthetically in an operating control device and be easily sealed against the environment. The variants of pushbutton switches are manifold, so that numerous possibilities result for the structuring of the control panel surface. Such pushbutton switches can also be provided in pairs, so

that the setting possibilities can be switched in steps in both possible sequences by the switches of a particular pair. If a desired setting is passed by, a step backwards is easy to perform without having to run through all possibilities again. Moreover, a certain analogy to rotary switches results, in which the setting possibilities can be switched through in steps in reverse sequence by reversing of the sense of rotation. The pushbutton switches, which as a pair form one setting element, can be constructed as a rocker switch. The component quantity and the assembly cost are thereby reduced, since the function of two separate switches is performed by one component and the undesired simultaneous actuation of two pushbutton switches is excluded.

The setting elements are advantageously provided with indications of the associated parameter. Thus, it is easily determined by which setting element the respective parameter setting can be changed. These indications can be applied directly to the setting elements themselves and/or be printed in their proximity, for example, on the surface of the control panel.

The operating program parameters can be, for example, the kind of program, the washing temperature and the spinning speed. The operating program is as a rule adequately defined by these so that, with the display of all these settings the user can, after checking, usually start the appliance. In addition, the set starting time and/or finishing time or the program can be displayed. Special additional settings can also be displayed. These can be, for example, a setting for running the program through in shorter time, a setting for washing with increased quantity of water, or a setting for presoaking the laundry. Similar additional setting possibilities are present in most program-controlled domestic appliances, so that they are advantageously included in the display in order to be able to be presented together with the main parameter settings in simple and easily surveyable manner.

Examples of the method and embodiments of the appliance of the present invention will now be more particularly described with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a domestic washing machine for performance of a method exemplifying the invention;

Fig. 2 is a front elevation of a control panel of a washing machine embodying the invention;

Fig. 3 is a set of views of part of the control panel for different steps in setting of program kind, temperature and spinning speed of the washing machine operation; and

Fig. 4 is a set of views of part of the control panel for different steps in setting of an additional parameter of the machine operation.

Referring now to the drawings, there is shown in Fig. 1 a washing machine 1 which has an operating control device with a control panel 2 by which operating programs for the machine can be composed by the user. Fig. 2 shows a possible arrangement of the control panel 2, which at the left has an on-switch 14 in order to set the machine into operation. A display 3, on which program parameter settings 4, 5, 6 and 7 are displayed, is arranged approximately in the middle of the panel 2. In the present case, the indicated settings are of the parameters program kind 4, washing temperature 5 and spinning speed 6. A setting of an additional parameter 7 is displayed in the lowermost line of the display 3.

The panel further includes several rotary switches 8, 9, 10 and 11 as setting elements, which are associated with the respective parameters 4, 5, 6 and 7 and by which the different setting possibilities can be switched through in steps. For this purpose, the rotary switches are constructed as incremental pulse transmitters and provided with perceptible detents for ease of manipulation. The association, which in any case is logical, can be supported by indications 12 printed on the panel 2 in the immediate proximity of the rotary switches. These indications 12 indicate which of the parameter settings can be changed by which switch. In addition, a start button 13 is provided for putting into action a composed operating program.

After switching-on of the washing machine 1 by the switch 14, a specific frequently-needed, preset program kind from a preset selection is indicated in the uppermost line of the display 3 in order to limit the setting actions, which are to be made for a normal operation, to a minimum. According to the program kind displayed in the first line, further parameter settings which are most feasible for the set program kind are displayed in the

following two lines. Since washing is usually carried out without setting of the additional parameter 7, nothing is displayed in the lowermost line. The program kind in the first line of the display can be changed by the rotary switch 8 by progressing through preset possibilities for the program kind. In that case, the contents of the lower lines for the parameters 5, 6 and 7 can change appropriately according to which settings come into question for the set program kind.

The additional parameter settings within the offered setting possibilities, which are dependent on the selected program kind, can be changed by rotation of the rotary switches 9, 10 and 11.

The display 3 with the indicated settings of the parameters 4, 5, 6 and 7 and the rotary switches 8, 9, 10 and 11 during the states a to k of a setting operation are illustrated in Figs. 3 and 4. In Fig. 3, the setting operation for an unusual operating program, which is inconvenient to set in normal circumstances, is illustrated, in particular sensitive wool to be washed in cold water and spun at low speed after the washing operation, with the washing step be shortened in time in order to preserve the knitwear.

In the state a, the preset standard program "coloureds ", washing at "60°C" and spinning at "1200 rpm" is still set, without additional settings. This is the standard program and is offered after switching-on of the machine.

Initially, the desired program kind "wool" is set. This occurs by the rotary switch 8, alongside which is provided the indication "program". On rotation of the rotary switch 8 through a first step, the operating control device is in the state b, for which the next setting possibility of the stored selection is set as the program kind 4, here "easy care". After rotating the rotary switch 8 through a second step, the state c is reached, in which the desired program kind 4 "wool" is set. In addition, on reaching the program kind setting "wool", the selection possibilities for the parameters of temperature and spinning speed are limited to lower values, since wool is more sensitive and should not be washed at high temperatures or spun at high speeds. In state c, only 40°C is indicated as washing temperature and only 900 rpm is indicated as spinning speed.

The setting of the washing temperature takes place analogously by the rotary switch 9. After rotation through a first step, the washing temperature is set to the next setting

possibility of "30°C" in state d. After rotation through a second step, the state e is reached, in which the next setting of "cold" is set as desired for the temperature value. Analogously thereto, the setting of the spinning speed takes place by the associated rotary switch 10. By its rotation and as illustrated in state f, the setting "900 rpm" for the spinning speed is changed to the desired setting "600 rpm".

Correspondingly, the additional setting "short" is set by rotation of the rotary switch 11 and the associated states g to k are illustrated in Fig. 4. State g corresponds with state f after setting of the spinning speed. By rotation of the rotary switch 11, the different possibilities of the selection for the settings of the additional parameter 7 are switched through in steps. The additional function "soak" is set in state h after the first step, the function "extra water" in state i is the next step and finally the desired function "short" in state k.

The different program parameter settings are selected in the same manner, namely by rotation of the associated rotary switches 8, 9, 10 and 11, wherein the different setting possibilities can be switched through in steps until the desired one is set. Thus, a simple setting is provided even in the case of more complicated compositions of operating programs. In that case, all the settings can be seen at one glance simply and reliably from the display 3, on which all settings are displayed together during the entire selecting process. After setting of the desired operating program, this can be set into motion by the starting button 13.

CLAIMS

1. A method of setting an operating program of a program-controlled domestic appliance with a plurality of setting elements each operable to set a respective program parameter, the method comprising the steps of selecting parameter settings by the setting elements to compose an operating program for the appliance and simultaneously displaying settings of a plurality of the parameters at display means of the appliance during the selecting step.
2. A method as claimed in claim 1, wherein the step of selecting comprises selecting a setting from a predetermined set of settings for at least one of the parameters.
3. A method as claimed in claim 1 or claim 2, wherein the step of selecting comprises selecting a setting from each parameter by progression through a range of settings in either one of two opposite sequences.
4. A method as claimed in any one of the preceding claims, wherein one of the parameters is program kind and the only settings able to be selected for the other parameters are settings predetermined to be permissible for the selected program kind.
5. A method as claimed in any one of claims 1 to 4, wherein one of the parameters is program kind and the method comprises the step of storing the selected program kind and the selected setting of each other parameter.
6. A method as claimed in any one of the preceding claims, wherein one of the parameters is program kind and includes at least one user-specific setting and the method comprises the step of selecting and storing settings of the other parameters specific to the user-specific program kind when selected.
7. A method as claimed in any one of the preceding claims, wherein the step of displaying comprises indicating the parameter settings one below the other in lines.
8. A method as claimed in any one of the preceding claims, wherein the step of displaying comprises indicating the parameter settings in uncoded text.

9. A method as claimed in claim 1 and substantially as hereinbefore described with reference to the accompanying drawings.

10. A program-controlled domestic appliance including operating control means to control the appliance to operate in accordance with an operating program composed of a plurality of parameters, a plurality of setting elements each operable to set a respective one of the parameters by selecting a setting thereof, and display means for simultaneously displaying settings of a plurality of the parameters during the selection process.

11. An appliance as claimed in claim 10, wherein the setting elements comprise rotary switches.

12. An appliance as claimed in claim 10, wherein the setting elements comprise pushbutton switches for switching the associated settings in steps.

13. An appliance as claimed in claim 10, wherein the setting elements comprise pairs of pushbutton switches for switching the associated settings in steps, each switch of each pair being operable to progress through a range of the associated settings in a respective one of two opposite sequences.

14. An appliance as claimed in claim 13, wherein the switches of each pair are respective parts of a rocker switch.

15. An appliance as claimed in any one of claims 10 to 14, wherein each of the setting elements is associated with an indication of the respective parameter.

16. An appliance as claimed in any one of claims 10 to 14, wherein the appliance is one of a washing machine, a laundry drier, a washer-drier, a baking oven, a cooker hob and a dishwasher.

17. An appliance as claimed in any one of claims 10 to 16, wherein the appliance is a washing machine, a laundry drier or a washer-drier and the parameters comprise at least one of program kind, laundry treatment temperature, spinning speed, additive feed, program start time and program end time.

18. An appliance as claimed in any one of claims 10 to 17, wherein one of the parameters is program kind and the associated setting element comprises a rotary switch with an integrated pushbutton switch, the rotary switch being operable to select a setting of that parameter and the pushbutton switch to cause the selected setting and settings of the other parameters to be stored.

19. An appliance as claimed in any one of claims 10 to 18, wherein the display means comprises an alpha-numeric display device.

20. A program-controlled domestic appliance substantially as hereinbefore described with reference to the accompanying drawings.



Application No: GB 9917440.1
Claims searched: 1-20

Examiner: Michael Prescott
Date of search: 6 October 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.Q): G3N (NG1A1, NG1A3, NG1A9)
Int CI (Ed.6): A47L 15/46; D06F 33/02, 39/00; G05B 19/042, 19/10; H05B 6/68
Other: Online databases: EPODOC, JAPIO, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X, P	GB 2323436 A (Societe Anonyme des Usines de Rosieres)	1-6, 8, 10, 12, 13, 15, 16, 19
X	GB 2262820 A (Kabushiki Kaisha Toshiba)	1-8, 10-17, 19
X	GB 2197730 A (Kabushiki Kaisha Toshiba) see Fig. 3 and description from page 20 onwards	1-8, 10-17, 19
X	GB 2017341 A (G. Bauknecht GmbH) see Figure 3	1-8, 10-17, 19
X	EP 0454143 A2 (Sharp Kabushiki Kaisha) see description of Figures 6(a-g)	1-8, 10-17, 19
X	US 4372054 (Emhart Industries, Inc.) See description of Figures 2A-F	1-8, 10-17, 19

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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